New Source Performance Standards for the Natural Gas Industry

On April 17, 2012, the Environmental Protection Agency (“EPA”) issued a final rule amending its regulations for air emissions from the oil and natural gas industry.\(^1\) Initially proposed in August of 2011, the amendments substantively revise New Source Performance Standards and National Emissions Standards for Hazardous Air Pollutants that were last updated over ten years ago. The rule will limit emissions of volatile organic compounds, sulfur dioxide, and other hazardous air pollutants from sources within natural gas processing plants, oil and natural gas production facilities, and natural gas transmission compressor stations. For many such sources, the final rule represents the first federal standards for air emissions, including emissions from hydraulically fractured natural gas wells. More particularly, the rule finalizes:

New Source Performance Standards for the Crude Oil and Natural Gas Production and Onshore Natural Gas Processing Plant source category.

The EPA reviewed two existing new source performance standards for the onshore natural gas processing plant source category under section 111 of the Clean Air Act. The rule improves the existing new source performance standards and finalizes standards for certain crude oil and natural gas sources that are not covered by existing new source performance standards for this sector; and

National Emissions Standards for Hazardous Air Pollutants for the Oil and Natural Gas Production source category and the Natural Gas Transmission and Storage source category. The EPA conducted risk and technology reviews for these rules under section 112 of the Clean Air Act.

\(^1\) New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews, Docket No. EPA-HQ-OAR-2010-0505.
Additionally, the EPA has established emission limits for certain currently uncontrolled emission sources in these source categories. These limits reflect maximum achievable control technology.

The final rule also includes modification and addition of testing and monitoring and related notification, recordkeeping and reporting requirements, as well as other minor technical revisions to the National Emissions Standards for Hazardous Air Pollutants.

I. Background

A. Industry Emissions

The oil and natural gas industry includes a wide range of operations and equipment, from wells to natural gas gathering lines and processing facilities, to storage tanks, and transmission and distribution pipelines. In 2009, about 1.1 million wells were producing oil and natural gas in the United States. The wells are located in many areas of the country, including both urban and rural areas. The majority of new gas wells drilled today use a process known as hydraulic fracturing or “fracking.” In this process, a mixture of water, chemicals and a “proppant” (usually sand) is pumped into a well at extremely high pressures to fracture rock and allow natural gas to escape. An estimated 1,400 new wells are fractured each year; EPA estimates another 1,400 existing wells are re-fractured to stimulate production or to produce natural gas from a different production zone. The gas these wells produce goes to gathering and boosting stations that take it to processing plants. These plants remove contaminants to make the gas ready for the pipelines that deliver it to commercial, industrial and residential customers. Transmission compression stations help move the gas through 1.5 million miles of natural gas pipelines across the United States.

According to the EPA, the industry is the largest industrial source of emissions of volatile organic compounds (“VOCs”), a group of chemicals that contribute to the formation of ground-level ozone (smog). The EPA estimates VOC emission from the oil & natural gas industry at 2.2 million tons a year in 2008. Furthermore, data provided to EPA’s Natural Gas

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2 Exposure to ozone is linked to a wide range of health effects, including aggravated asthma, increased emergency room visits and hospital admissions, and premature death.
STAR Program show that some of the largest air emissions in the natural gas industry occur as natural gas wells that have been fractured are being prepared for production. During a stage of well completion known as “flowback,” fracturing fluids, water, and reservoir gas come to the surface at a high velocity and volume. This mixture includes a high volume of VOCs and methane, along with air toxics such as benzene, ethylbenzene and n-hexane. The typical flowback process lasts from three to 10 days. Pollution also is emitted from other processes and equipment in the industry that prepare gas for sale and that assist in moving it through pipelines.

B. Specific Rulemaking Authority through the Clean Air Act

The final rule marks the outcome of the EPA’s review of four existing air regulations for the oil and natural gas industry required under the Clean Air Act (“CAA” or the “Act”):

- A new source performance standard for VOCs;
- A new source performance standard for sulfur dioxide (“SO₂”);
- An air toxics standard for major sources of oil and natural gas production; and
- An air toxics standard for major sources of natural gas transmission and storage.

1. New Source Performance Standards

Section 111(b) of the CAA requires the EPA to set new source performance standards (“NSPS”) for industrial categories of new and modified sources that cause, or significantly contribute to, air pollution that may endanger the public health or welfare. The NSPS must reflect the application of the best system of emissions reductions (“BSER”) that has been adequately demonstrated. The EPA is required to review these standards every eight years. The existing NSPS - for VOCs and SO₂ - were issued in 1985 and regulate natural gas processing plants.

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3 Methane is a greenhouse gas more than 20 times as potent as carbon dioxide. Benzene, ethylbenzene, and n-hexane are pollutants known to, or suspected of causing cancer and other serious health effects.
Specifically, section 111(b) of the CAA requires the EPA Administrator to list categories of stationary sources, if such sources cause or contribute significantly to air pollution, which may reasonably be anticipated to endanger public health or welfare. The EPA must then issue performance standards for such new and modified stationary source categories, the NSPS. The EPA has the authority to define the source categories, determine the pollutants for which standards should be developed, identify the facilities within each source category to be covered and set the emission level of the standards. The EPA is required to “at least every 8 years review and, if appropriate, revise” performance standards. However, the Administrator need not review any such standard if the “Administrator determines that such review is not appropriate in light of readily available information on the efficacy” of the standard. When conducting a review of an existing performance standard, the EPA has authority to revise that standard to add emission limits for pollutants or emission sources not currently regulated for that source category.

In setting or revising a performance standard, the CAA provides that performance standards are to “reflect the degree of emission limitation achievable through the application of the best system of emissions reductions (“BSER”) which (taking into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.” In determining BSER, the agency typically conducts a technology review that identifies what emission reduction systems exist and how much they reduce air pollution, in practice. Next, for each control system identified, the EPA evaluates its costs, secondary air benefits (or non-benefits) resulting from energy requirements and non-air quality impacts such as solid waste generation. The resultant standard is usually a numerical emissions limit, expressed as a performance level (i.e., a rate-based standard or percent control), that reflects the BSER. Although such standards are based on the BSER, the EPA may not prescribe a particular technology that must be used to comply with a performance standard, except in instances where the Administrator determines it is not feasible to prescribe or enforce a standard of performance. Typically, sources remain free to select any control measures that will meet the emission limits. Upon promulgation, an NSPS becomes a national standard to which all new sources must comply.
2. National Emissions Standards for Hazardous Air Pollutants

Section 112(d) of the CAA also requires the EPA to set emissions standards (the National Emissions Standards for Hazardous Air Pollutants or “NESHAP”) for existing and new facilities in each category of major sources and area sources of hazardous air pollutants (“HAPs”) listed under the Act. These standards are required to reflect maximum achievable control technology (“MACT”) based on EPA’s evaluation of the best performing (lowest emitting) sources. The agency must conduct residual risk review of these standards eight years after the standards issued, and technology reviews of these standards every eight years. The final rule amends two NESHAPs, both promulgated in 1999, covering oil and natural gas production and natural gas transmission and storage.

Specifically, section 112 of the CAA establishes a two-stage regulatory process to address emissions of HAP from stationary sources. In the first stage, after the EPA has identified categories of sources emitting one or more of the HAP listed it must identify the MACT, after considering cost, energy requirements and non-air quality health and environmental impacts. MACT standards are set to reflect application of measures, processes, methods, systems or techniques, including, but not limited to, measures which, (1) reduce the volume of or eliminate pollutants through process changes, substitution of materials or other modifications, (2) enclose systems or processes to eliminate emissions, (3) capture or treat pollutants when released from a process, stack, storage or fugitive emissions point, (4) are design, equipment, work practice or operational standards (including requirements for operator training or certification) or (5) are a combination of the above.

A MACT standard may take the form of a design, equipment, work practice or operational standard where the EPA first determines either that, (1) a pollutant cannot be emitted through a conveyance designed and constructed to emit or capture the pollutant or that any requirement for or use of such a conveyance would be inconsistent with law or (2) the application of measurement methodology to a particular class of sources is not practicable due to technological and economic limitations. The EPA is then required to review these technology-based standards and to revise them “as necessary (taking into account developments in practices, processes, and control technologies)” no less frequently than every 8 years.

The second stage in standard-setting focuses on reducing any remaining “residual” risk. This provision requires, first, that the EPA prepare a Report to Congress discussing (among other
things) methods of calculating risk posed (or potentially posed) by sources after implementation of the MACT standards, the public health significance of those risks and the EPA’s recommendations as to legislation regarding such remaining risk. The CAA requires the EPA to determine for source categories subject to MACT standards, whether the emissions standards provide an ample margin of safety to protect public health.

If the MACT standards for HAP that are “classified as a known, probable, or possible human carcinogen do not reduce lifetime excess cancer risks to the individual most exposed to emissions from a source in the category or subcategory to less than 1-in-1 million,” the EPA must promulgate residual risk standards for the source category (or subcategory), as necessary, to provide an ample margin of safety to protect public health. In doing so, the EPA may adopt standards equal to existing MACT standards if the EPA determines that the existing standards are sufficiently protective. (“If EPA determines that the existing technology-based standards provide an ‘ample margin of safety,’ then the Agency is free to readopt those standards during the residual risk rulemaking.”). The EPA must also adopt more stringent standards, if necessary, to prevent an adverse environmental effect, but must consider cost, energy, safety and other relevant factors in doing so.

C. Litigation History

The final rule is the result of a lawsuit brought by several environmental groups. On January 14, 2009, WildEarth Guardians and the San Juan Citizens Alliance filed a complaint in the United States District Court for the District of Columbia and alleged that the EPA failed to meet its obligations under CAA sections 111(b)(1)(B), 112(d)(6) and 112(f)(2) to take actions relative to the review and revision of the NSPS and the NESHAP with respect to the Oil and Natural Gas Production source category. On February 5, 2010, the Court entered a consent decree that, as successively modified, required the EPA to sign by July 28, 2011, proposed standards or determinations not to issue standards pursuant to the CAA and to take final action by April 3, 2012. On April 2, 2012, the consent decree was modified to change the date for final action to no later than April 17, 2012.

4 NRDC v. EPA, 529 F.3d 1077, 1083 (D.C. Cir. 2008).

5 On April 27, 2011, pursuant to paragraph 10(a) of the Consent Decree, the parties filed with the Court a written stipulation to extend the proposal date from January 31, 2011, to July 28, 2011, and
II. Summary of the Final Rule’s Major Provisions

In general, the final rule has no direct impact on oil wells. Petroleum refineries and natural gas facilities located “downstream” of the transmission sector are not covered by the rule.

The final rule revises the NSPS for VOCs from equipment at onshore natural gas processing plants and the NSPS for SO$_2$ emissions from natural gas processing plants. Along with the operations covered by the existing standards, the new standards will regulate VOC emissions from gas wells, centrifugal compressors, reciprocating compressors, pneumatic controllers and storage vessels. The rule finalizes the residual risk and technology review for the Oil and Natural Gas Production source category and the Natural Gas Transmission and Storage source category. Additionally, the EPA has established emission limits reflecting maximum achievable control technology for certain currently uncontrolled emission sources in these source categories. Lastly, the rule finalizes revisions to the regulatory provisions related to emissions during periods of startup, shutdown and malfunction. The emission sources affected by the NSPS include well completions, pneumatic controllers, equipment leaks from natural gas processing plants, sweetening units at natural gas processing plants, reciprocating compressors, centrifugal compressors and storage vessels which are constructed, modified or reconstructed after August 23, 2011.

The final rule revises the NESHAP for glycol dehydration unit process vents and leak detection and repair requirements. The emission sources that are affected by the Oil and Natural Gas Production NESHAP and the Natural Gas Transmission and Storage NESHAP include glycol dehydrators and equipment leaks. The EPA did not finalize proposed air toxics standards for storage vessels without the potential for flash emissions, which currently are not regulated under the NESHAP for Oil and Natural Gas Production. The agency determined that it needs additional data in order to establish emission standards for this type of storage vessel. The previous standards for storage tanks with the potential for flash emissions remain in place.

the final action date from November 30, 2011, to February 28, 2012. On October 28, 2011, pursuant to paragraph 10(a) of the Consent Decree, the parties filed with the Court a written stipulation to extend the final action date from February 28, 2012, to April 3, 2012.
A. New Source Performance Standards for Crude Oil and Natural Gas Production and Onshore Natural Gas Processing Plant Source Category

The new NSPS for the Crude Oil and Natural Gas Production source category regulate VOC emissions from gas wells, centrifugal compressors, reciprocating compressors, pneumatic controllers, storage vessels and leaking components at onshore natural gas processing plants, as well as SO₂ emissions from onshore natural gas processing plants. The rule sets forth performance standards for the following sources.

1. Gas Wells

The rule covers any gas well that is “an onshore well drilled principally for production of natural gas.” For fractured and refractured gas wells, the rule generally requires operators to use reduced emissions completions technology, also known as “RECs” or “green completions,” to control VOC emissions during flowback from well completion. The final rule defines “flowback” as “the process of allowing fluids to flow from a natural gas well following a treatment, either in preparation for a subsequent phase of treatment or in preparation for cleanup and returning the well to production.” Under the rule such flowback begins “when material introduced into the well during the treatment returns to the surface immediately following hydraulic fracturing or refracturing” and the flowback ends “with either well shut in or when the well is producing continuously to the flow line or to a storage vessel for collection.” Reduced emissions completions technology involves well operators routing the recovered liquids into one or more storage vessels or re-inject the recovered liquids into the well or another well, and route the recovered gas into a gas flow line or collection system, re-inject the recovered gas into the well or another well, use the recovered gas as an on-site fuel source, or use the recovered gas for another purpose that a purchased fuel or raw material would serve, with no direct release to the atmosphere.

Before January 1, 2015, operators must reduce VOC emissions either by flaring using a completion combustion device or by capturing the gas using green completions with a completion combustion device, unless combustion is a safety hazard or is prohibited by state or local regulations. Beginning on January 1, 2015, operators must capture the gas and make it...
available for use or sale, which they can do through the use of green completions. The EPA estimates that use of green completions for the three- to 10-day flowback period reduces VOC emissions from completions and recompletions of hydraulically fractured wells by 95 percent at each well.

2. **Storage Vessels**

The final rule defines “storage vessel” as “a unit that is constructed primarily of nonearthenn materials (wood, concrete, steel, fiberglass, or plastic) which provides structural support and is designed to contain an accumulation of liquids or other materials.” Storage vessels at natural gas well sites are commonly used to store condensate, crude oil and produced water. Individual storage vessels in the oil and natural gas production source category and the natural gas processing, transmission and storage source category with emissions equal to or greater than 6 tons per year (“tpy”) must achieve at least 95 percent reduction in VOC emissions.

3. **Certain Controllers**

The final rule sets a natural gas bleed rate limit of 6 standard cubic feet per hour (“scfh”) for individual, continuous bleed, natural gas-driven pneumatic controllers located between the wellhead and the point at which the gas enters the transmission and storage segment. For individual, continuous bleed, natural gas-driven pneumatic controllers located at natural gas processing plants, the rule sets a natural gas bleed limit of zero scfh.

4. **Certain Compressors**

The final rule requires a 95 percent reduction of VOC emissions from wet seal centrifugal compressors located between the wellhead and the point at which the gas enters the transmission and storage segment. The rule also requires measures intended to reduce VOC emissions from reciprocating compressors located between the wellhead and the point where natural gas enters the natural gas transmission and storage segment. The operators of these compressors must replace the rod packing based on specified usage or time.

installed horizontally or vertically, used in exploration and production operations to combust otherwise vented emissions from completions.”
5. **Equipment Leaks at Onshore Natural Gas Processing Plants**

For onshore natural gas processing plants, the final rule revises the existing NSPS requirements for leak detection and repair to reflect the procedures and leak thresholds established in the NSPS for Equipment Leaks of VOCs in the Synthetic Organic Chemicals Manufacturing Industry. The rule also revises the existing NSPS requirements for SO$_2$ emission reductions 99.8 percent to 99.9 percent based on reanalysis of the original data.

6. **Startup, Shutdown, and Malfunction Provisions**

The final rule provides that there is no exemption from compliance with emission standards during periods of startup, shutdown, and malfunction for the facilities subject to this rule. The rule contains in affirmative defense to civil penalties for periods of non-compliance with emissions standards during malfunctions.

7. **Notification and Reporting Requirements**

Operators of hydraulically fractured and refractured natural gas wells must notify the EPA by e-mail no later than two days before completion work begins. The notification must include geographic coordinates of the affected wells and the estimated date that well completion will begin. Well owners and operators who are subject to state advance notification requirements for well completions will meet EPA’s requirements by meeting the state notification requirements. Annually, owners and operators must submit a report on their well completions that is certified by a senior company official attesting to the report’s truth, accuracy and completeness.

B. **National Emissions Standards for Hazardous Air Pollutants for Oil and Natural Gas Production and Natural Gas Transmission and Storage Source Category**

Glycol dehydrators, used to remove water vapor from gas, are subject to one of two air toxics standards, depending on their location. Dehydrators located at the well site are subject to the NESHAP for Oil & Natural Gas Production. The final rule retains the existing standards for large glycol dehydrators and sets new standards for small glycol dehydrators. The final rule also retains the existing 1-ton-per year benzene compliance option for large glycol dehydrators, meaning operators may reduce benzene emissions from large dehydrators to less
than 1 ton per year as an alternative to reducing total air toxics emissions by 95 percent. The rule also establishes new leak detection and repair (“LDAR”) requirements for equipment, and amends the definition of “associated equipment,” meaning that emissions from all storage vessels now will be counted toward determining whether a facility is a major source under the NESHAP for Oil and Natural Gas Production. Lastly, the changes to the NESHAP for Oil & Natural Gas Production in the final rule apply only to sources that are considered “major sources” of air toxics. A major source emits 10 or more tons a single air toxic and 25 tons or more of a combination of toxics in a year.

1. Small Dehydrators

A dehydrator is considered small if it has an annual average natural gas throughput of less than 85,000 standard cubic meters per day, or actual annual average benzene emissions of less than 1 ton per year. Both existing and new small glycol dehydrators must meet a unit-specific limit for emissions of benzene, toluene, ethylbenzene and xylene that is based on the unit’s natural gas throughput and gas composition. The limit is determined by applying a formula set out in the final rule. New small glycol dehydrators must comply with the air toxics requirements immediately upon startup or within 60 days after the final rule is published in the Federal Register, whichever is later. Existing small glycol dehydrators must comply within three years after the effective date of the rule. A small glycol dehydrator is considered existing if construction or reconstruction began before Aug. 23, 2011.

2. Equipment Valves

The final rule establishes new leak detection standards for valves. Under these standards, a leak triggering the rule’s LDAR requirements is any measurement exceeding 500 ppm of any regulated hazardous air pollutant.


Similar to the NSPS, the final rule provides that there is no exemption from compliance with emission standards during periods of startup, shutdown, and malfunction for the facilities subject to this rule. The rule contains in affirmative defense to civil penalties for periods of non-compliance with emissions standards during malfunctions.
III. Conclusion

The final rule takes effect 60 days from its publication in the *Federal Register*. As of the date of this writing, the final rule had not yet been published, but a pre-publication version is available at [http://epa.gov/airquality/oilandgas/actions.html](http://epa.gov/airquality/oilandgas/actions.html).

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